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ON PAGE 3

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"WEAPONS BLAST FROM ORBIT"

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Australia's importance to the US beam weapons program is that it is in an ideal location. The satellites with which it is linked are 22,300 miles above the equator where they can look down on the Soviet missile fields, in geosynchronous orbit – ie, they stay directly above the same spot on the earth's surface.

The platforms for detecting Soviet missile launches, tracking them and if necessary destroying them with beam weapons all need to hang above the Australian longitudes.

US scientists say it would be easier to kill an unfriendly ICBM when it is heavy with fuel soon after launch, rather than waiting until it is closer to its target on the other side of the globe.

The choice between lasers and particle beams is a matter of argument in the US defence establishment: both are being developed.

The main problem with particle beams is getting enough power to deliver destructive energy over long distances. The technology is based on the charged particle accelerators which have been used for decades as atom smashers in high energy physics.

As a weapon, the particle beam would look like a giant lightning bolt, with the particles ripping into the molecular structure of the target, setting fire to fuel and vaporising a nuclear warhead.

If deployed from the ground, a beam weapon runs into problems of being bent by the Earth's magnetic field.

Laser beams penetrating the atmosphere are dissipated by dust and rain.

For these reasons, space basing is seen as preferable.

The advantages of the weapons would be enormous speed and rapid rate of fire with only tiny bursts needed to destroy sensitive electronic components in satellites.

The laser goes at the speed of light, 185,000 miles a second, the particle beam at only a little under this.

This means that once the weapon is pointed at the target there is no need to "lead" the target and there can be no escape. An ICBM would have moved only a couple of inches, for example, in the time it would take for a lethal burst of photons or other atomic particles to scorch across thousands of miles of space.

Although extremely precise tracking devices are being developed, the way beam weapons can be pulsed at a tremendously fast rate means that they have the chance to take repeated shots at a target. The detection system designates a "window" through which the missile will pass and this area can be sprayed by the beam.

One target detector under development uses a mosaic of infra-red sensors, another entails a new laser radar.

A key role is played by huge "adaptive optics" mirrors in the detectors and the laser pointing system. The mirror surface is composed of thousands of small parts which are altered to get exact focus by a system of tiny electronic chips.

Feasibility of the deployment of laser and particle beam weapons in the near future is hotly disputed in the US, but progress has been impressive, starting with a drone shot down by a laser in 1973 and moving to a Tow missile kill by a TRW laser in 1978.

BRIAN TOOHEY reports from Washington on how Australia, under the Fraser Government's new defence proposals may host ground stations for an American space weapons system designed to destroy Soviet ICBMS as they are launched.

SIPAPU is an American Indian word for "sacred fire": Nurrungar is an Australian Aboriginal word meaning "listen."

The words are being given a fearsome new life by the Pentagon's space warfare plans. Under a project called Sipapu a "sacred fire" of hydrogen atoms could be hurled thousands of kilometres across space to incinerate Soviet ballistic missiles detected by a base in the Australian desert called Nurrungar which listens to the electromagnetic signature of the missile.

The Pentagon plans to give Australia a key role in its plans to develop laser and particle beam weapons that can knock out satellites and ballistic missiles.

The US effort has so far cost more than $2,000 million and the work is being stepped up. Programs under the Directed Energy Technology now get the biggest chunk of the Pentagon's research and development budget.

The laser work is being done under projects codenamed Talon Gold, Alta, and Lode.

The particle beam work on Sipapu is being done at the Los Alamos laboratories which did much of the original development of the atomic bomb. A shorter range beam weapon based on sub-atomic particles is called Chair Heritage.

Some of the codewords on the target tracking and beam pointing projects are Teal Ruby, Hi-Comp, and Halo.

The first military payload on the US space shuttle planned for 1983 will include some of the sensors needed for the tracking of Soviet intercontinental ballistic missiles, long-range bombers, and cruise missiles.

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